12

THEORY AND PRACTICE

OF THE

AMERICAN SYSTEM

OF

THROUGH FAST FREIGHT

TRANSPORTATION

As Illustrated in the Operations

OF THE

Empire Transportation Company.

THE EMPIRE TRANSPORTATION CO.

Will be pleased to have you visit its Exhibition Building, located on the Centennial Grounds, to inspect its various Working Models, Maps, Drawings, etc., illustrating the American system of Through Transportation by all-rail and by rail and water, and the transportation of petroleum through pipe lines.

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ATLANTIC, DULUTH AND

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ROUTE of ANCHOR LINE STEAMERS

ANCHOR LINE

CHICAGO

BAY CITY

SAGINAW

G. Rapids

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DETROIT

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ANCHOR LINE

TOLEDO

CLEVELAND

FT WAYNE

LAFAYETTE

INDIANAPOLIS

Columbus

Cincinnati

Louisville

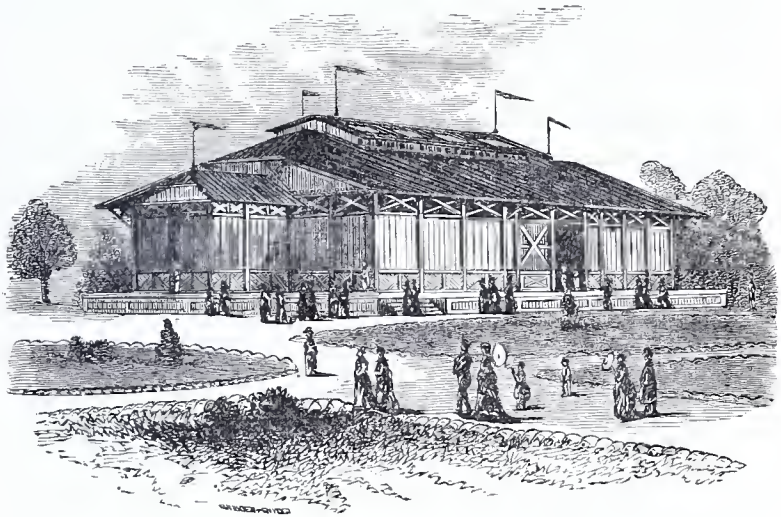
PREFACE.

The march of progress during the first century of American Independence is nowhere better illustrated than in the variations of plans and methods of freight transportation.

It is the design of this work to present, in concise form, the distinctive features (as illustrated in the operations of the Empire Transportation Company) of that system of through fast freight transportation which has attained uniformly satisfactory practical results in the United States.

The organization, equipment, and operations of the several freighting divisions of this Company are stated in detail, and the theory and practice of the through fast freight system are discussed. These statements and discussions are preceded by a brief description of the Empire Transportation Company's Centennial Exhibition Building and its contents.

The Empire Transportation Company's Centennial Exhibition.



THE BUILDING.

The Centennial Exhibition Building of the Empire Transportation Company (officially numbered 119) is located directly north of the Avenue of the Republic, and adjacent to its south-eastern entrance gate. It consists of a main building forty-five feet long by thirty-five feet wide, with two wings, each twelve feet long by ten feet wide. The general design of the building conforms to an usual style of American railroad freight-house. It is built in part of material that will be hereafter used in car construction. A shelf or counter extends around the entire interior of the building, on which working models illustrative of the various interests of the Company are displayed.

RAIL TRANSPORTATION—Car Models.

On the counter a double line of light railroad track has been laid, and over it are run handsomely-finished models of five of the standard styles of cars in actual present use. As an annex to and adjacent to the main building, several hundred feet of railway have been laid, on which a handsome model of a locomotive engine, one-fourth full size, draws a train of similarly-proportioned model freight cars. A neat, ornamental shed is provided on this track to accommodate and protect this engine and train when not in service.

LAKE TRANSPORTATION—Propellers and Grain Elevators.

The actual operations of unloading and elevating grain from a lake propeller, and of loading and weighing the same grain into and out of cars, are shown by appropriate working models. A lake propeller with her load of western grain lays alongside a model elevator that is engaged in discharging her cargo. On a model railroad track scale, located on the land-side of the elevator, a car is weighed both light and loaded, and then sealed up preparatory to starting for its eastern seaboard destination. From the elevator the loaded car is run to a point of discharge, where the operations of weighing and unloading are gone through with.

PETROLEUM OIL TRANSPORTATION.

One of the wings of the Exhibition building is occupied by a working model of a section of the Pennsylvania oil-producing region. The operations of erecting well-derricks, drilling wells, and of pumping and flowing oil wells, are illustrated; and a model oil refinery is shown, in front of which a small locomotive engine is run with an attached train of Empire Line oil cars, such as are used for the transportation by rail of the refinery product.

PETROLEUM OIL PIPE LINES.

The other wing is occupied by an exhibit designed to illustrate the important oil pipe line interests of the Empire Transportation

Company. An oil well and fixtures are shown, together with a completely-appointed pipe line pumping station in actual operation; also, a model of a pipe line office, telegraph line, &c. The production of the model oil well is received at the pumping station and forced through a line of pipe to a receiving tank located on an elevated portion of the counter adjacent to the railroad track. From this receiving tank the oil runs by gravity to a loading rack, where a model tank oil car is loaded.

PETROLEUM OIL—Terminal Facilities.

The car is then run to the other side of the building, where it is discharged into an underground tank, as is customary at terminal oil delivery points. Adjacent to the place where the oil is discharged there is located on the six-foot counter a small model, exhibiting, in full and accurate detail, the arrangement of one of the terminal seaboard depots provided for handling the extensive crude and refined petroleum traffic of this Company.

MERCHANDISE—Terminal Facilities.

There is also displayed on this counter a small model of one of the extensive merchandise piers and depots of the Empire Transportation Company, located on the New York side of the North river, with a float and cars adjacent thereto, illustrating the plan adopted by this Company in transferring its loaded merchandise cars across the North river.

EXPERIMENTAL MODELS.

Numerous experimental and original models of grain-doors, car-locks, seals, draw-bars, car-bodies, &c., designed for and under instructions of the Empire Transportation Company, occupy the balance of the counter. As these models illustrate an uninterrupted effort to meet the requirements of the public, and to aid in developing the science and perfecting the art of through transportation, they will no doubt be found of interest to the visitor.

TRANSPORTATION MATERIAL.

The space below the counter is occupied by full-sized samples of the car-trucks, wheels, axles, springs, draw-heads, pumps, pipe, &c. that are at present in actual use by the Company in its different operations.

THE EMPIRE TRANSPORTATION CO.'S ROUTES.

The wall space above the counter is occupied on one side with an outline map showing the principal rail and water routes over which the Empire Transportation Company's lines operate between the Atlantic and Pacific seaboard cities. On the other sides are displayed its commercial forms in present use; also, photographs, maps, &c., illustrative of general transportation interests and of the distinctive features of the system governing its operations.

ACKNOWLEDGMENT.

Concluding this description of its Centennial Building and contents, the Empire Transportation Company desires to acknowledge its indebtedness to the following parties, to whose courtesy it owes many of the features of interest connected with its exhibit as herein described:—

ALLISON & SONS, W. C., ... Philadelphia,
Car Builders and Flue Manufacturers.
BILLMEYER & SMALL, ... York, Pa.,
Car Builders.
BLAKE MANUFACTURING CO., ... 86 and 88 Liberty St., N. Y.,
Steam Pump Manufacturers.
DAVENPORT, FAIRBAIRN & CO., . . . Erie, Pa.,
Wheel Manufacturers.
DELANEY FORGE AND IRON CO., . . . Buffalo, N. Y.,
Axle Manufacturers.
ERIE CAR WORKS, ... Erie, Pa.,
Car Builders.
FAIRBANKS & EWING, ... Philadelphia,
Scale Manufacturers.
GALENA OIL WORKS, ... Franklin, Pa.,
Oil Refiners.

GILL, JOHN L., ... Columbus, O.,
Car Builder and Wheel Manufacturer.
HELFENSTEIN, LEWIS & GREENE, . . . Philadelphia,
Railroad and Commercial Printers.
JACKSON & WOODIN MANUFACTURING CO., Berwick, Pa.,
Car Builders.
LOSEE, V., ... New York,
Ship and Steamboat Joiner and Carpenter.
McKEE, FULLER & CO., ... Catasauqua, Pa.,
Wheel Manufacturers.
MIDDLETON, N. & A., ... Philadelphia,
Car Spring Manufacturers.
MURRAY, DOUGAL & CO., ... Milton, Pa.,
Car Builders.
NATIONAL STORAGE CO., ... New York,
New York Oil Agents.
RAMAPO WHEEL AND FOUNDRY CO., . . Ramapo, N. Y.,
Wheel Manufacturers.
RIEHLE BROS., ... Philadelphia,
Scale Manufacturers.
ROBERTS & CO., A. & P., ... Philadelphia,
Axle Manufacturers.
ROBINETT, J. J., ... Petersburg, Va.,
M. M. A. M. & O. R. R.
ROGERS, STEPHEN, ... New York,
Painter in Oil and Fresco.
SCHALL, MICHAEL, ... York, Pa.,
Car Builder.
VOSE, DINSMORE & CO., ... New York,
Railway Supplies.
WATERMAN & BEAVER, ... Philadelphia,
Rail Manufacturers.
WINSLOW CAR ROOFING CO., ... Cleveland, O.,
Car Roofing Manufacturers.
WRIGLEY, HENRY E., ... Titusville, Pa.,
Civil Engineer.

EMPIRE TRANSPORTATION COMPANY'S EXECUTIVE ORGANIZATION.

At the general offices of the Empire Transportation Company, Philadelphia, Pennsylvania, the following officers of the Company are located, having supervision (in their several departments as indicated by their titles) of the entire operations of all the lines and organizations controlled by this Company:—

President,	JOS. D. POTTS,	1129 Girard Street.
Vice-President,	FRANK J. FIRTH,	1125 Girard Street.
Treasurer,	H. H. HOUSTON,	1123 Chestnut Street.
Assistant Treasurer,	JAS. S. SWARTZ,	1123 Chestnut Street.
Gen'l Freight Agent,	W. F. GRIFFITTS, Jr.,	1127 Girard Street.
Auditor,	WM. G. MACDOWELL,	1125 Girard Street.
Assistant Auditor,	F. M. BISSELL,	1125 Girard Street.
Purchasing Agent,	A. D. HEPBURN,	1129 Girard Street.

The following officers are in direct charge of the work of the several lines and departments, as indicated by their titles, their offices being at the respective addresses stated:—

EMPIRE LINE.

Eastern Superintendent,	GEO. M. BALL,	Williamsport, Pa.
Western Superintendent,	GEO. W. RISTINE,	Cleveland, Ohio.
Secretary,	W. H. BARNES,	Pittsburgh, Pa.

GREEN LINE.

General Agent,	W. J. BRUNDRED,	Oil City, Pa.
Treasurer,	JAS. S. SWARTZ,	Philadelphia, Pa.

ANCHOR LINE.

Western Manager,	E. T. EVANS,	Buffalo, N. Y.
Eastern Manager,	JNO. E. PAYNE,	Erie, Pa.
Secretary and Treasurer,	GEO. B. BONNELL,	Philadelphia, Pa.

ATLANTIC, DULUTH AND PACIFIC LAKE COMPANY.

Manager,	E. T. EVANS,	Buffalo, N. Y.
General Western Agent,	J. T. WHITING,	Detroit, Mich.

UNION PIPE COMPANY.

Manager,	C. P. HATCH,	Parker, Pa.
General Agent,	C. J. EASTWICK,	Parker, Pa.
Supt. Parker and Butler Divisions,	W. C. HENRY,	Parker, Pa.
Superintendent Foxburg Division,	J. W. SMILEY,	Foxburg, Pa.

TITUSVILLE PIPE COMPANY.

Manager,	A. B. HOWLAND,	Titusville, Pa.

OLEAN PIPE LINE.

Manager,	J. H. DILKS,	Olean, N. Y.

AGENCIES.

The Empire Transportation Company has established agencies for conducting the business of its several working organizations at the following named places:—

ALLENTOWN, PA.
BALTIMORE, MD.
BEECHWOOD, PA.
BEACH HAVEN, PA.
BERWICK, PA.
BLOOMSBURG, PA.
BETHLEHEM, PA.
BOSTON, MASS.
BUFFALO, N. Y.
BURLINGTON, IOWA.
BAY CITY, MICH.
BUTLER, PA.
CONCORD, PA.
COCKEYSVILLE, MD.
COMMUNIPAW OIL YARDS, N. J.
CORRY, PA.
CAMERON, PA.
CHICAGO, ILL.
CLARENDON, PA.
CLEVELAND, O.
COUNCIL BLUFFS, IOWA.
COLUMBIA, PA.
DAGUSCAHONDA, PA.
DANVILLE, PA.
DETROIT, MICH.
DRIFTWOOD, PA.
EMPORIUM, PA.
EASTON, PA.
ELIZABETH, N. J.
ELIZABETHPORT, N. J.
ERIE, PA.
EAST SAGINAW, MICH.
ESPY, PA.
FORT WAYNE, IND.
FOXBURG, PA.
GARLAND, PA.
HARRISBURG, PA.
HESTONVILLE, PA.
HAZLETON, PA.
HICKS' FERRY, PA.
INDIANAPOLIS, IND.
IRVINETON, PA.
KANE, PA.
KINGSTON, PA.
LUDLOW, PA.
LANCASTER, PA.
LAFAYETTE, IND.
MAUCH CHUNK, PA.
SHENANDOAH, PA.
MAHANOY CITY, PA.
PACKERTON, PA.
JEANSVILLE, PA.
Lehigh District.
LEHIGHTON, PA.
LEWISBURG, PA.
LOCK HAVEN, PA.
LAURY'S, PA.
MILWAUKEE, WIS.
MILTON, PA.
NANTICOKE, PA.
NEWARK, N. J.
NEW YORK, N. Y.
NORTHUMBERLAND, PA.
OLEAN, N. Y.
OMAHA, NEB.

TIDIOUTE, PA.
TRUNKEYVILLE, PA.
OLEOPOLIS, PA.
OIL CITY, PA.
TITUSVILLE, PA.
} Oil City District.
PITTSFIELD, PA.
PEORIA, ILL.
PHILADELPHIA, PA.
PITTSTON, PA.
PLYMOUTH, PA.
PITTSBURGH, PA.
PARKER, PA.
PORT HURON, MICH.
QUAKAKE, PA.
QUINCY, ILL.
READING DISTRICT, PA.
RIDGWAY, PA.
SPRING CREEK, PA.
SHEFFIELD, PA.
ST. MARY'S, PA.
ST. LOUIS, MO.
SCRANTON, PA.
SHICKSHINNY, PA.
STERLING, PA.
SLATINGTON, PA.
SUNBURY, PA.
TOLEDO, O.
TERRE HAUTE, IND.
UNION, PA.
WILLIAMSPORT, PA.
WILCOX, PA.
WARREN, PA.
WYOMING, PA.
WATERFORD, PA.
WILKESBARRE, PA.
YORK, PA.
YOUNGSVILLE, PA.

Empire Transportation Company's All-rail Transportation.

The through transportation of competitive traffic by *all-rail routes* was the purpose for which the Empire Transportation Company was originally organized, and this purpose has been kept steadily in view as the one end to which all its other operations are merely necessary auxiliaries. Its extended lake organization and equipment (hereafter described) aids its rail interests by enabling the Company to afford to the shippers of heavy, coarse freights a choice of transportation routes during a season when a certain class of trade will always seek the low-priced though slower water routes. A strong hold on the trade is thus secured for all-rail lines during the balance of the season.

Its oil pipe system, another auxiliary, is necessary to insure to the Company the control it must have of the large petroleum traffic that it is expected to transport to the eastern seaboard cities.

This oil pipe system forms the link connecting the wells, where the petroleum is produced and controlled, with the railways over which the all-rail transportation lines operate.

Some years since, this Company inaugurated a practice that has so largely contributed towards increasing its efficiency and ability to satisfactorily serve the public, that a brief reference to it here seems proper. It has always striven to make available for each of its representatives the combined ability and experience possessed by all the others; and to aid in accomplishing this end, it was decided to institute a plan of annual meetings of all the officers and leading employees. These meetings are held on call of the President, at an agreed time and place, each employee being previously furnished with a list of subjects agreed on to be discussed. Plans and models of improvements that can be suggested in the details

of car construction, and written communications on any subject of business interest, are invited to be presented at the meeting. On assembling, the meeting appoints a number of committees, to one of which each subject is referred after full and free discussion. The committees report to the meeting in writing, and such action as the meeting determines on is taken on each report. The reports are then referred to a meeting of officers held at the general offices at Philadelphia, on call of the President, where all their recommendations are carefully considered and official decisions arrived at, that are announced, in printed form, to all parties interested, and thereafter govern the business policy of the Company until changed. These meetings have been found to very greatly aid in securing harmony of action and a more intelligent understanding of and interest in the Company's business. In pursuance of this same policy, similar meetings have been held in the interest of the lake service. The Company's vessel-captains have met, on the call of their respective managers, for an interchange of views and the recommendation of such rules as would, in their joint judgment, best aid in increasing the efficiency of this branch of the service. The perils of navigation were freely discussed, and plans for avoiding or lessening them. Each captain thus received the benefit of the experience of all the others, and the common interest for which they were alike working was better understood by all. It is believed that meetings, in this extended form, are peculiar to this Company.

Empire and Green Lines.

The Empire Transportation Company's organizations for the care of its through competitive traffic by its all-rail routes are known commercially as the Empire Line (having a red arrow-head ◄ as its trade-mark) and the Green Line. The Green Line title is made use of for convenience in the geographical division of the petroleum traffic of the Company. All petroleum or its products shipped to the East from points south of Oil City, Pa., is moved by the Green Line. The route of this line is by way of the low-grade railroad from Red Bank station, on the Allegheny Valley Railroad, to Driftwood station, Philadelphia and Erie Railroad, and thence east, for all shipments from points north of the West Pennsylvania Railroad Junction with the Allegheny Valley Railroad; and by way of the West Pennsylvania Railroad and Pennsylvania Railroad, for all shipments from points south of the said junction, including points on the West Pennsylvania Railroad.

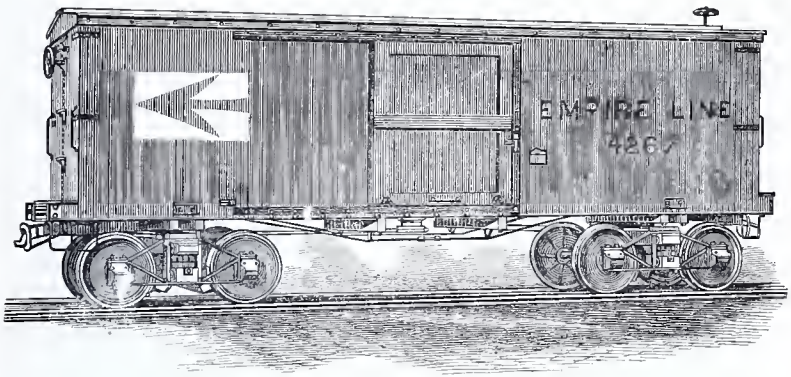
All petroleum or its products shipped to the East from Oil City, or points north, is moved by the Empire Line via the Philadelphia and Erie Railroad.

The entire all-rail merchandise traffic of the Company is done in the name of the Empire Line, and is moved via the Philadelphia and Erie Railroad and its rail connections.

CAR EQUIPMENT.

These two all-rail lines jointly offer to the public over four thousand five hundred cars of compromise gauge, suitable for passing over any of the roads of the customary width of track, and embracing, in style of construction, all the standard varieties which the necessities of the trade demand.

A few cuts are here given to illustrate the construction and appearance of several of the Company's standard patterns of cars.



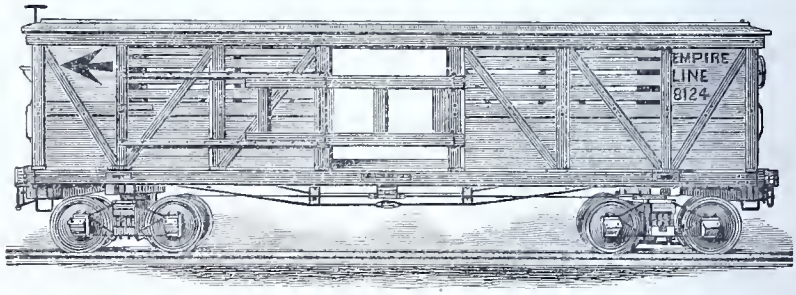
BOX CAR.

The Box or House Car is the most available style of car for general traffic, and is used for the transportation of grain, flour, boxed meats, wool, cotton, &c. eastward, and miscellaneous merchandise westward. A large number of box cars have been specially fitted up by this Company for the traffic in butter, eggs, fresh meats, oysters, fruits, and other perishable articles. These cars are double throughout, and lined with a non-conductor of heat. They have the most approved styles of ventilators and ice-boxes, and are frequently inspected en route by the Company's designated employees; ice-boxes filled; ventilators examined; and every precaution taken to insure the proper carriage of their contents. To determine what quantities of ice and condition of ventilation will produce the best practical results, experiments are made during the season, aided by accurate records at all passing points, in connection with observations of registering thermometers sent through in the cars. Much valuable data has been attained in this way, and many important improvements have resulted.

The increasing popularity of these cars specially prepared for the transportation of perishable freight, and the gratifying endorsement they have received from individual shippers and from conventions of shippers (at which the cars have been

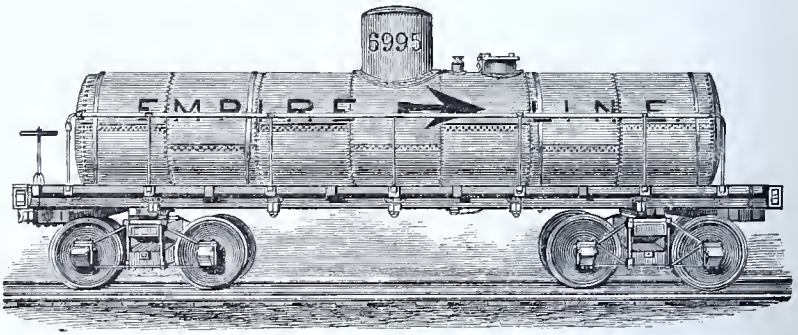
exhibited and inspected), induced the continuance of experimental research, and still further improvements in construction have resulted, which will be adopted during the present season.

The Rack Car is chiefly employed in the transportation of lumber, oil in barrels, railroad iron, iron pipe, coal, and similar heavy freights. These cars are somewhat similar in appearance to the stock cars in use by this Company, although the actual detail of construction is different—the stock cars having been designed and built for the



RACK CAR.

express purpose of moving live stock, and being adapted to that work. The flat or gondola cars that the Company has in service are chiefly used in the movement of heavy stone blocks, iron castings, and similar articles of freight, the character of which requires that they should be loaded in open cars.



TANK CAR.

The Tank Car is employed entirely in the movement, in bulk, of crude or refined petroleum. Each car consists of a wrought-iron

boiler on trucks—the boiler having a capacity of about 3600 gallons. The boiler is fitted with man-hole, expansion-dome, valves, &c., and needs the best material and workmanship to insure safety of its contents from leakage, as there are few liquids so difficult to hold in any receptacle as petroleum or its products.

All the car stock of the Company is frequently and carefully inspected, and is kept up to the highest attainable standard, in the belief that the most economical car-repair results are thus attained.

To secure that uniformity throughout the entire service which is so essential in the case of any similarly-extended organization, a central supply department has been attached to the general office of the Empire Transportation Company at Philadelphia. From this department all the blank forms of freight receipts, bills of lading, bill-heads, letter-heads, and all other commercial forms that pass between the Company's representatives and its patrons, are supplied in established and common forms, on requisition of any of its officers or agents. As the result of this central source of uniform supply, the eastern grain-dealer who may be in receipt of consignments and bills of lading from a dozen or more separate western Empire Line shipping points, will find all his bill of lading contracts on precisely the same form, printed from the same stereotyped plates, and with uniform transportation conditions. This of itself is a valuable illustration of transportation progress, as compared with the ancient system (still in effect over some routes), under which the eastern grain-dealer would receive from each separate shipping station a separate form of bill of lading, requiring a separate and careful study to ascertain the rights, if any, which the originator might bestow upon the patron of his route.

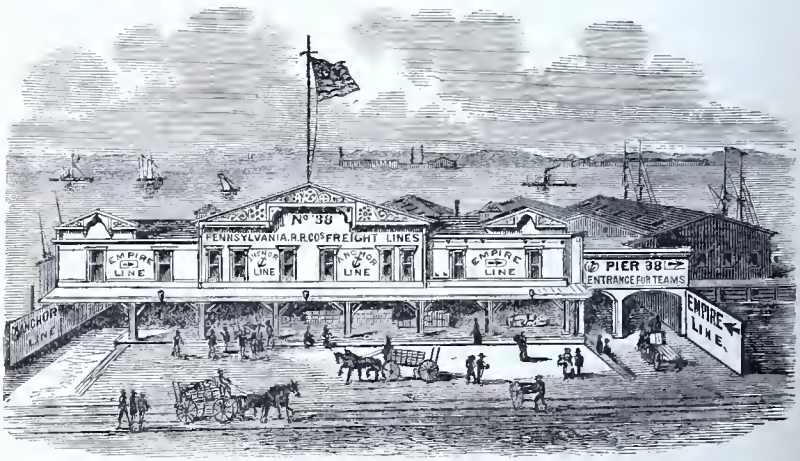
TERMINAL FACILITIES.

The question of adequate and efficiently managed terminal facilities is such an all-important one to the successful handling of a large freight traffic at the important business centres where such traffic always concentrates, that it is desired to present here a few facts with reference to the provision this Company has made in this respect at its leading eastern seaboard termini.

NEW YORK.

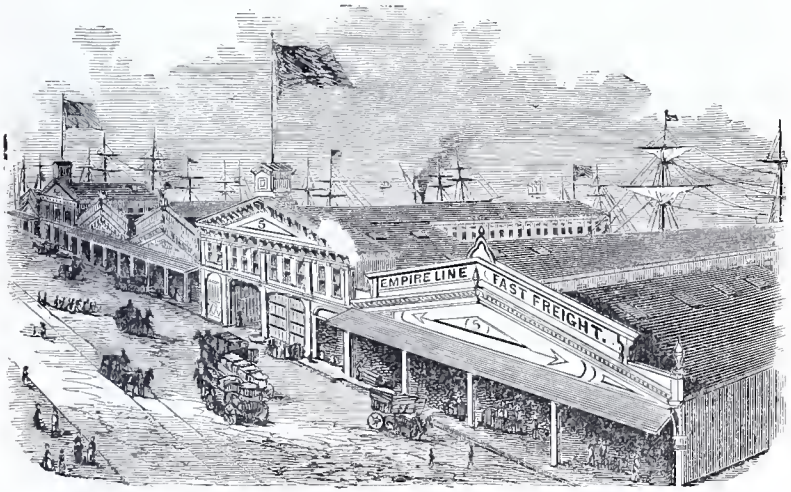
For the accommodation of its merchandise traffic at New York, the Empire Transportation Company has two of the most extensive and best arranged depots on the New York side of the North river.

Cars loaded with east-bound freight are transferred across the North river on floats specially constructed for this service, and delivered at the New York side piers with locks and seals unbroken, as they left the western points of shipment. When the east-bound freight has been discharged, the cars are loaded with west-bound merchandise, locked, sealed, and transferred by the same floats to the Jersey City side of the river, whence they are taken by rail to their various distant western destinations. Each float employed in this service carries eight or ten cars, half on each side of a covered centre platform, over which the freight is handled from and to the piers. These floats are moved across the river by tug-boats, and their movement is regular and uninterrupted throughout the year. This plan of transfer of freight across the North river marks another important step forward in the way of perfecting the transportation system, as it avoids the necessity for the extra handling that attended the old plan of unloading and loading cars on the Jersey City side, and moving the freight in drays on ferry-boats or in bulk across the river.



PIER 38, NORTH RIVER, NEW YORK.

Pier 38, on the New York side of the North river, at the foot of Hubert street, is the depot for up-town freight, and is the locality at which the greater part of the west-bound merchandise traffic is handled. At this point there are about one and three-quarter acres under cover, and office accommodation is provided for the large clerical force required to carry on the business done.

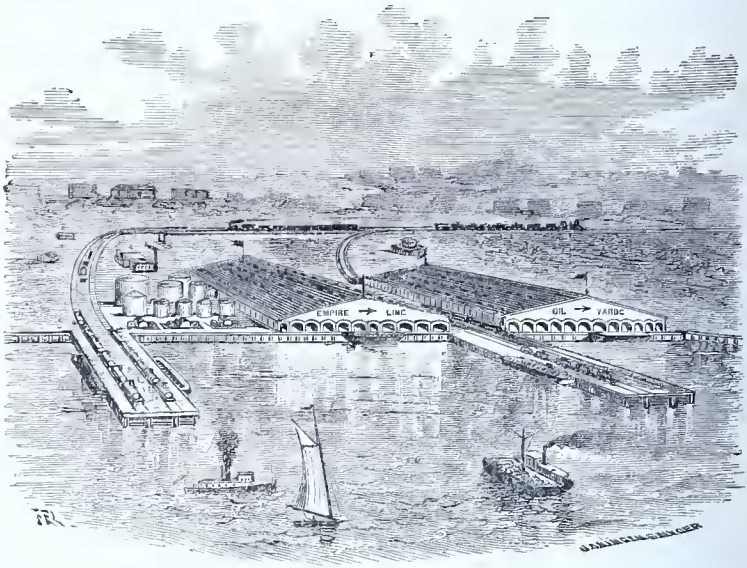


PIERS 4 AND 5, NORTH RIVER, NEW YORK.

Piers 4 and 5, on the New York side of the North river, at the foot of Morris street, are the depots for down-town freight. The heavy freights, such as sugar, molasses, &c. west-bound, and flour, boxed meats, cotton, &c. east-bound, are handled at this locality. Here there are three acres under cover, and the best facilities for the reception, care, and delivery of flour are afforded that are available anywhere in New York City. Offices are provided for the accommodation of the clerical force required.

Great care has been taken to provide against the danger of loss by fire at these two depots. Fire-extinguishers, hose-connections, water-buckets, &c. are readily accessible, and reliable employees, under regular drill, are assigned to understood posts of duty, in event of any indication of trouble from this cause. The prompt suppression of the only fire that has ever occurred here bears practical testimony to the efficiency of this branch of the service.

PETROLEUM OIL YARD.



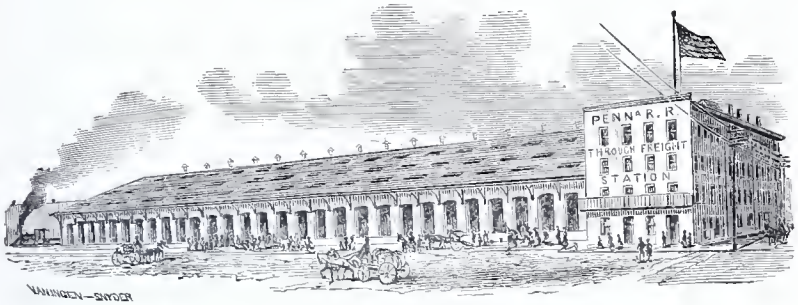
COMMUNIPAW OIL YARDS.

The above cut represents the oil depots, located at Communipaw station, on the Central Railroad of New Jersey, and at which this Company's traffic in petroleum at New York harbor is handled.

These yards are carefully arranged with reference to the greatest attainable economy in the reception, care, and delivery of petroleum and its products in bulk and in packages. Extensive warehouses are provided for the storage of petroleum in packages; and iron tanks of various sizes, conveniently located, provide for that part of the traffic that is done in bulk. Tracks running out on the shipping piers admit of the direct transfer, from cars to vessels, of through traffic destined beyond Communipaw. The refineries located in New York harbor receive their crude petroleum from these yards in bulk-boats carrying from 1000 to 1500 barrels, which are moved between the refineries and the yards by tug-boats.

A very complete and accurate model of this oil terminus forms one of the attractive features of the Centennial Exhibition, made by the Empire Transportation Company, and before referred to.

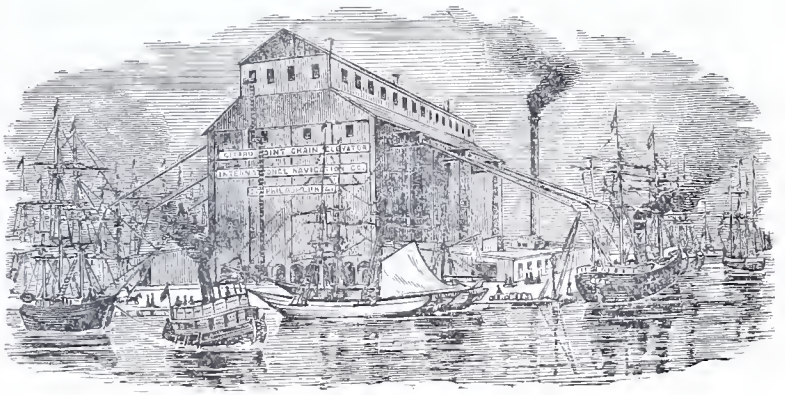
PHILADELPHIA.



DOCK STREET DEPOT.

The greater portion merchandise traffic of the Company to and from Philadelphia is handled at the Dock street depot, represented in the above cut. This depot is a commodious structure, conveniently located for the accommodation of shippers and receivers.

The various other depots established by the Pennsylvania Railroad Company for the reception and delivery of merchandise traffic within the limits of the city of Philadelphia are also used by this Company, its business to and from said city being done over the Pennsylvania Railroad Company's lines of railway, and in their interest.



GIRARD POINT ELEVATOR.

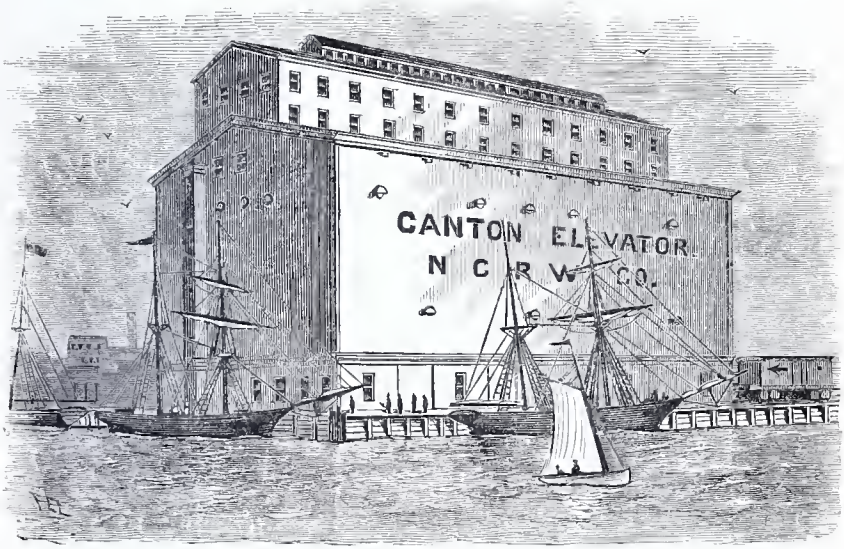
At the Girard Point elevator, shown in the accompanying cut, the bulk of the export grain trade via Philadelphia is handled. It is so located that steam and sail vessels of the largest class can come to and lay alongside of it for the discharge and reception of their cargoes. It is owned and operated by the International Navigation Company, who are also the proprietors of the Red Star Line of steamships trading between Antwerp, Belgium, and the United States. Another extensive elevator, located at Washington avenue wharf, is also largely engaged in the export and also in local grain trade. At West Philadelphia the Pennsylvania Railroad Company has provided a large grain warehouse for the exclusive accommodation of the local or city trade, separate car-load bins being provided, and storage furnished at reasonable rates. The weight of all grain entering this house is determined by weighmen representing the Railroad Company and the Produce Exchange, and this weight is the recognized basis of all transactions in this grain.

BALTIMORE.

EMPIRE TRANSPORTATION COMPANY'S
EMPIRE TRANSPORTATION COMPANY'S
FAST FREIGHT TO AND FROM ALL POINTS WEST
BALTIMORE MERCHANDISE DEPOT

NORTH STREET DEPOT.

The Empire Transportation Company's Baltimore freight depot is located at No. 199 North street. This depot was erected by the Company in April, 1870, and provides ample accommodation for its large and growing trade at this point. It also makes use of the different depots of receipt and delivery that the Northern Central Railway Company (over whose line this city is reached) has established within the city limits for the accommodation of its patrons.



N. C. R. W. CO.'S GRAIN ELEVATOR.

The grain trade of the Company is handled at the Canton elevators—that of the Northern Central Railway Company (now constructing) and Gardner's Union elevator, which adjoins it. These elevators are excellently located for the economical transfer of export grain from cars to vessels, and are also arranged to accommodate the local traffic of the city.

Extensive warehouses for the reception and delivery to vessels of export merchandise trade shipped from Baltimore, and also for the storage and forwarding of salt, coffee, naval stores, &c. arriving at Baltimore by water, are owned and operated in connection with Gardner's Union elevator.

Empire Transportation Company's Lake Transportation.

THE ERIE AND WESTERN TRANSPORTATION CO.

The interests of the Empire Transportation Company on the great western lakes are represented by the Erie and Western Transportation Company, the capital stock of which it owns. This latter Company operates under two trading titles that have been adopted for convenience in the geographical division of its business.

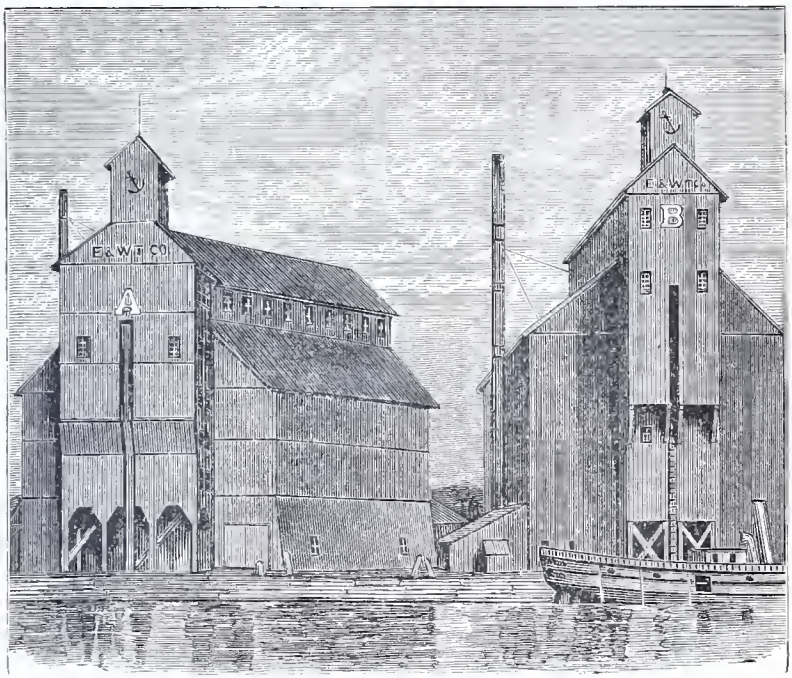
The "Anchor Line," having a red anchor as its trade-mark, is entrusted with the work at and east of Erie, Pa., and on Lakes Erie, Huron, and Michigan.

The "Atlantic, Duluth and Pacific Lake Company," having a blue monogram as its trade-mark, is entrusted with the Lake Superior passenger and freight business of the Company.

The Erie and Western Transportation Company has established offices, depots, and soliciting agencies at the prominent eastern seaboard cities, at western lake ports, and at important interior points. These agencies solicit freight for transportation by the Company's lines, issue through bills of lading, make through manifests, collect their through transportation charges, settle claims against the Company, and generally are the parties known to the public who patronize this Company's routes.

At Erie, Pa., the Company owns about thirty-five acres of dock and water lots, on which are located two large grain elevators and all necessary depot and other facilities adapted to the business wants of the Company, including offices, passenger depot, ice-house, supply stores, coaling wharves, &c. The tracks of the Philadelphia and Erie Railroad cross the docks and enter the

elevators; freight depots and storage yards of the Company being conveniently located for securing the most economical results attainable in the handling and transfer of freight between the lake and the rail.



ERIE ELEVATORS.

The above cut represents the Erie elevators of the Company, the distinctive features of which are as follows:—

Elevator B, erected in 1870, is a frame structure ninety-six feet long by seventy-two feet wide, enclosed by substantial brick fire-walls, and has a slate roof. The main building is one hundred and nine feet, and the tower one hundred and twenty-four feet in height. The stone foundations of the building stand on nests of nine to fifteen piles each, that were driven to and rest on the solid rock at an average depth of seventeen feet. Surrounding the

piling is a sunken crib filled solid with lake sand. Forty-seven separate bins furnish an aggregate storage capacity of two hundred and fifty thousand bushels, and the transfer capacity direct from lake to rail may be estimated at one hundred thousand bushels per each twenty-four hours. A steam-engine of the most approved construction furnishes the power requisite to do the work of the building. The plan of operating the elevator is as follows:—

A movable ship-leg, containing an endless five-ply rubber belt one hundred and fifty-seven feet long and seventeen inches wide, on which one hundred and fifty-four metal buckets of nine quarts capacity each are secured, is lowered from the house into the hold of an adjacent grain-loaded vessel; the belt is then started and elevates the grain to the hopper of a one-hundred-bushel receiving scale located in the elevator tower, where it is weighed; after weighing, the grain is dropped by gravity into an iron receiver located below the floor of the building. From this receiver it is elevated on another similar bucket-belt to a large distributing bin at the top of the house. From this bin the grain is spouted by gravity into any one of the numbered storage bins, from which it is again spouted (direct into cars), when ready for shipment by rail. Two railroad tracks, accommodating six cars at a time, are located in the building below the storage bins. On each railroad track there is a track scale of the most approved pattern, which is frequently tested by sealed weights and kept in perfect repair. The light weight of each car is taken on entering the building, and the loaded weight as it passes out,—the difference giving the weight of the grain. *Each lot of grain is kept entirely separate and distinct from every other, no mixing or grading of grain being allowed.* A small sample is taken from each lot of grain handled, and is preserved for reference if desired. Great attention has been paid to making the most perfect provision against fire losses.

Elevator A.—This elevator has an aggregate storage capacity of one hundred thousand bushels of grain in thirty-one separate bins, and a transfer capacity of say seventy-five thousand bushels in each twenty-four hours. The general features of the plan of operating it are similar to those previously described for Elevator B.

The lake vessels forming the Company's lines, and the traffic in which they are engaged, are as stated in the following tables:—

ANCHOR LINE (IN LAKE MICHIGAN TRADE).

Name.	Class.	Capacity.		
		Tons Freight.	Passenger.	
			1st Class.	Emigrant
Philadelphia,	Screw steamer (iron),	1500	.....	.....
Alaska,	" " "	1500	.....	.....
India,	" " "	1482	150	500
China,	" " "	1485	150	500
Japan,	" " "	1429	150	500
Annie Young,	" "	1006	.....	.....
Wissahickon,	" "	1750	.....	.....
T. A. Scott,	" "	1159	.....	.....
Gordon Campbell,	" "	1200	.....	.....
Arizona,	" "	1000	40	200
Annie Sherwood,	Sail vessel,	1200	.....	.....
Schuylkill,	" "	900	.....	.....
Allegheny,	" "	1200	.....	.....

ANCHOR LINE (IN LUMBER TRADE IN LOWER LAKES).

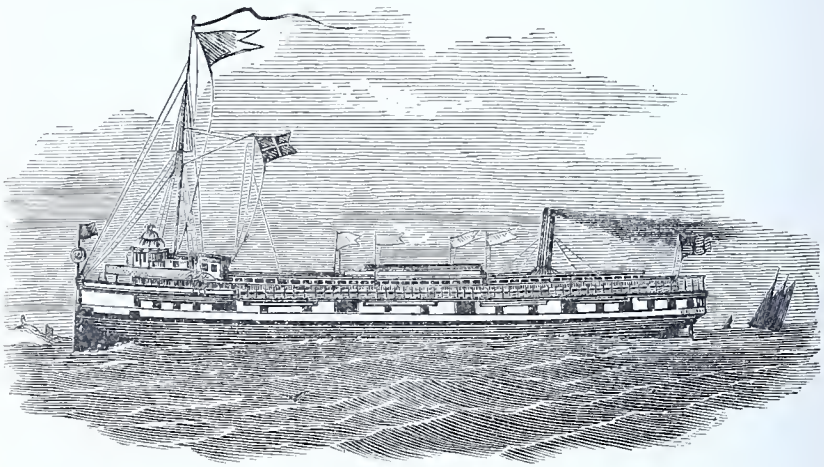
Name.	Class.	Feet Lumber Capacity.
R. Prindiville,	Steam,	350,000 feet.
Keepsake (tow),	Sail barge,	360,000 "
C. H. Weeks (tow),	"	375,000 "

ATLANTIC, DULUTH AND PACIFIC LAKE CO. (IN LAKE SUPERIOR TRADE).

Name.	Class.	Capacity.		
		Tons.	Passenger.	
			1st Class.	Emigrant
*Arctic,	Screw steamer,	780	120	500
*Atlantic,	" "	666	120	500
*Pacific,	" "	786	120	500
Winslow,	" "	1157	150	500

* Owned by Union Steamboat Company, with whom the Atlantic, Duluth and Pacific Lake Company has running arrangements and forms a joint line.

The following is a cut of the propeller India, one of the Company's standard iron freight and passenger steamers, which are the finest vessels, in every respect, engaged in the passenger business on the great lakes.



PROPELLER INDIA.

This propeller is two hundred and ten feet long, thirty-two feet six inches wide, and fourteen feet deep. She was built in 1871 at Buffalo, N. Y., at a cost of $175,000. Her cabin and staterooms are handsomely finished in hard woods and elegantly carpeted. The stateroom bedding and furniture, and the table appointments throughout, are those of a first-class hotel. The full requirements of the very stringent United States law with respect to provision against the results of accidents of every sort have been literally complied with in the equipment of each of the Company's vessels.

THE WESTERN STATES LINE.

The Western States Line operates on the Erie Canal, and is a feeder to the Erie and Western Transportation Company's vessel lines from Buffalo, N. Y.

Albany, Troy, Rochester, Syracuse, and the other important New York State towns on the line of the Erie Canal, contribute to and receive tonnage from the lake line.

OIL PIPE LINE TRANSPORTATION.

The oil pipe lines (previously referred to) constitute one of the most extended and important of the varied interests of the Empire Transportation Company. They perform an essential service in gathering into a common stock, for delivery to the Company's rail lines, the oil produced by the numerous wells with which they connect. The history of their origin, growth, and extent may be briefly stated as follows:—

In June, 1866, the fact having been established that petroleum could be satisfactorily moved through long lines of wrought-iron tubing, a controlling interest was purchased in the Titusville Pipe Company—it being designed to serve as a feeder to the Empire Transportation Company's rail lines at Titusville, Pa. Later, the remaining interests in the line were acquired, vesting the sole title in this Company.

In April, 1872, the entire pipe property of what was then known as the Mutual Pipe Line Company was purchased by the Empire Transportation Company, and a valuable feeder to its rail lines at Foxburg station, on the Allegheny Valley Railroad, was thus secured.

The Union Pipe Company's property was similarly acquired by purchase in September, 1872; its point of rail delivery being at Parker's station, on the line of the Allegheny Valley Railroad.

In January, 1873, the first oil developments having been made in what is known as the Butler district, the Empire Transportation Company at once commenced the construction of its Butler pipe lines; their points of rail delivery being at Butler and Dilks stations, on the Western Pennsylvania Division of the Pennsylvania Railroad.

In October, 1873, for the accommodation of the public and to secure increased economy in operating, the Mutual Pipe Company, Union Pipe Company, and Butler Pipe Line were consolidated into one organization, and were thereafter known as the Foxburg, Parker, and Butler Divisions of the Union Pipe Company.

In December, 1875, the Olean Pipe Line was laid from the newly-discovered Limestone or Bradford oil district, a distance of about fifteen miles, to Olean station, on the line of the Buffalo, New York and Philadelphia Railroad.

The several pipe lines referred to are all at present in active operation, and, with the extensions and additions that have been made from time to time as required by changes in the localities of oil production, represent a present total of over four hundred miles of pipe, and give the Empire Transportation Company an efficient representation in every important oil-producing territory.

To properly appreciate the work of the oil pipe lines, a brief description of their equipment, plan of operating, and business done, will be of interest. The pipe used is wrought iron, lap-welded, ordinarily but two inches in diameter, and is put together with a screw sleeve-joint. The main pumping line or lines are run from the centre of production by the most direct route practicable to the railroad station selected as a delivery point. The pipe is usually laid on the surface of the ground, being covered only on road-crossings, where it enters streams, on river beds, and at other similar places where this protection from breakage may be thought necessary. At the railroad, large iron receiving tanks are erected, varying from five to twenty thousand barrels capacity each. These tanks are located at a sufficient elevation above the railroad to permit their contents to be run by gravity through pipes to the loading racks that are located adjoining the railroad tracks. At the necessary intervals along the main lines of pipe, pumping stations are established for the reception and forwarding of the oil. The equipment of these main stations consists of a pump-house, with two or more powerful pumps; the necessary steam-boiler capacity and boiler-house; two tanks of from five hundred to two thousand barrels capacity each, located in a substantial tank-house; a telegraph office; and a building for the accommodation of the employees in charge. From each pipe line station, branch connecting lines lead off in every direction to the hundreds of different wells that are tributary to it. At each well, accurately-gauged storage tanks are located, to which the pipe line branches are attached. Before commencing to draw oil from these tanks into the pipe lines, their contents are measured and recorded. Another measure and record is made after the pipe line ceases taking oil from them, and the difference, in inches, between the two measures forms a basis of credit to the oil-owner on the Company's books. A memorandum receipt, known as a

gauger's ticket, is given to the well-owner or his representative at the time the oil is run into the pipe line, and a negotiable certificate for all or any part of the oil credited to the well-owner on the Company's books is issued on call at the pipe company's central office, or on telegraphic request. These gauger's tickets and certificates clearly set forth on their face the conditions on which petroleum is received and held for transportation by the Company. All petroleum received goes into a common stock, from which deliveries are made in accordance with orders received from the owners.

Some of the physical difficulties surmounted have been remarkable. On one line a single pump forces oil through a continuous string of two-inch pipe a distance of sixteen and one-quarter miles, overcoming, on the way, an elevation of four hundred and thirty feet. On another, fourteen miles in length, an elevation of nine hundred and sixty-eight feet is similarly overcome.

The average capacity, per twenty-four hours, of a single main line of two-inch pipe may be considered as about forty thousand gallons each. A completely equipped private telegraph line forms a necessary appendage to each of the Company's pipe organizations.

The important character and extent of this branch of the business will perhaps be best appreciated by here introducing some statistics of the actual operations of these lines of pipe.

From the dates herein named as the commencement of their operations, up to and including March 31st, 1876, the Empire Transportation Company's pipe lines have moved an aggregate of three hundred and seventy-five millions eight hundred and ten thousand five hundred and fifty-one (375,810,551) gallons of crude petroleum.

The oil certificates issued, as before explained, are negotiable papers, and pass from hand to hand as the actual representatives of the oil they call for. They are frequently purchased for investment when oil is low, and carried by dealers until advancing prices enable them to be disposed of with profit to the holder. The quantity of petroleum held in store, in tanks located in the Pennsylvania oil region, may be stated as averaging from eighty to one hundred and twenty millions (80,000,000 to 120,000,000) of gallons.

THE EMPIRE TRANSPORTATION COMPANY. CONDITIONS AND FUNCTIONS.

The operations of this organization are so extended, so peculiar, and so many-sided, that a definite statement of the facts and theories which led to its creation, and the conditions attending its development and growth, will, it is believed, be found of interest.

These operations have from their commencement grown steadily to their present magnitude; and this growth has been so unheralded that its scope is not well understood by the public, nor perhaps even by the railways who employ it.

The charter of the Company was granted by the State of Pennsylvania early in 1865. An organization was effected soon after. Cars were procured and active operations commenced on the twenty-sixth day of June, 1865, by an actual shipment from the Oil Creek Railway of five car loads of petroleum in barrels to New York.

Broadly stated, the purpose of the Company was to increase convenience, promptness, and safety in the transfer of property between inland points west of the line of the Philadelphia and Erie Railway and points on the Atlantic slope and seaboard, and in the Foreign Countries east thereof, and to do so in such manner as should popularize with the shipping public the route formed by that railway and its various connections.

This route consisted of a number of railways independently owned and managed, but curiously invested with discordant interests, which impelled them asunder with greater force than the interests possessed in common drew them together. These dispersive forces have increased in vigor under later combinations and alliances, so that a clear perception of the identity which actually exists among them, and a watchful care in developing and securing it, has been one of the leading functions of this Company, and a fundamental condition of its value and life.

On the accompanying map of the routes over which the Empire Transportation Company now operates, heavy, crossed, black lines indicate the railways with which contracts were made in the first year of the Company's life.

When this Company began its work, the Philadelphia and Erie Road had not been opened a year—had no trade except that which was strictly local, and was leased by the Pennsylvania Railroad Company, whose own route via Pittsburgh was among the oldest, most successful, and most efficiently organized of the then-existing competitors for through traffic.

The adopted route between New York and Erie consisted of four separate railways:—

1. The Central of New Jersey, *New York to Easton.*
2. The Lehigh Valley, ... *Easton to Quakake.*
3. The Catawissa, ... *Quakake to Milton.*
4. The Philadelphia and Erie, *Milton to Erie.*

Between Erie and Philadelphia it was formed of—

5. The Pennsylvania, ... *Philadelphia to Harrisburg.*
6. The Northern Central, . . *Harrisburg to Sunbury.*
4. The Philadelphia and Erie, *Sunbury to Erie.*

Between Erie and Baltimore the route west of Harrisburg was identical with that last named; but from Harrisburg to Baltimore the Northern Central was followed.

West of Erie was—

7. The Cleveland and Erie, *Erie to Cleveland.*
8. The Cleveland, Columbus and Cincinnati, *Cleveland to Galion.*
9. The Pittsburgh, Ft. Wayne and Chicago, *Galion to Chicago.*
10. The Bellefontaine Line, *Galion to Indianapolis.*

Of these ten railway companies, Nos. 1 and 2 had a heavy and profitable coal trade, and looked indifferently upon a low-priced

miscellaneous competitive merchandise traffic; No. 5 had its own original route via Pittsburgh; and No. 6 had its own route via Elmira. Nos. 7, 8, and 10 were historically and commercially affiliated with the older routes via Dunkirk and Buffalo; and No. 9 had the incentive of one hundred and eighty-seven miles additional haul to tempt it via Pittsburgh, which was its eastern terminus.

Into this disunited medley, mechanically joined together, but without any strong, vital bond, this Company was set as a vehicle through which the community of interest that really existed therein might find expression in such practical way as should be profitable to the railways and useful to the public.

PLAN.

In considering the question of a suitable method for an effective execution of the purpose in view, several prominent facts presented themselves. The trade sought was all competitive, and it was already actively competed for. The routes struggling for its carriage had partially divested themselves of many of the ancient evils attending the early introduction of railways, and were, for the period, formidably efficient.

Could the public be attracted to a route less skillfully conducted? It did not seem safe to attempt the experiment.

In earlier days, when the management of a railway—like the construction of a poem—was committed to those who were born managers, and not to those who were fitted for the service by mere training, there was a flavor attendant upon official control—over even the minutest roadway if it had but tracks of iron—which was delightfully autocratic.

There is such power in aggregated capital, directed to the supplying, for hire, of some leading human need, that the sense of wielding it, and shaping the course of its action, intoxicates the steadiest brains when freshly experienced.

Partly out of this exalted frame of mind grew a great indifference to the troubles of patrons, or to any search for a remedy, or to the application of a remedy which might be indicated. Each road, if but fifty miles in length, had its own traffic—its own time-tables—its own classification of property—its own methods and forms and

habits; and no part of its right to these features was likely to be frittered away by any weak concessions to, or consideration for, public convenience or profit. If goods were delivered to it by a connecting road, under a through contract to destination, the contract was likely to be ignored, its own rates charged, and the consignee left without practical redress; for the contracting road was apter to be bankrupt than solvent. A consignment might be delivered to it damaged. It was seldom yielding enough to pay for such injury, but preferred to be strictly legal, though excessively annoying, and refer the owner to the roads beyond its own borders. The suffering owner, if the injury was not great, would probably pocket his loss and abandon further effort, rather than seek for the offending party through a series of roads, each equally intent on escaping responsibility.

"Time is money," was a proverb much dishonored in practice; while to the more agreeable apothegm of "luck in leisure," great deference was observed. If the little typical road under consideration successfully conveyed a consignment to the end of its own tracks, nothing could exceed the tranquillity with which it considered any further progression of the shipment. Its own duty accomplished, why need it be concerned if the goods for which the unfortunate dealer in Chicago anxiously waited, were moored for weeks on a siding not a hundred miles from the seaboard shipping point? They might even be plundered or destroyed, and yet its serenity find no ground for disturbance.

Differing gauges were prolific in delays, and the consequent transfers, fruitful in injury to property.

The bankruptcy of roads was a very Pandora's box of troubles. Solvent connections would require payment of accumulated freight charges prior to transferring goods to a neighbor who might find it inconvenient to pay afterwards.

Delays from bankruptcy were endless. Employees of insolvent companies struck to enforce the discharge of unpaid dues for service. Limited equipment and inferior track were constant characteristics of such corporations, and weary hindrances and great destruction of goods, inevitable consequences.

Remedies for these evils had been attempted, and the blending of short lines under single managements had been serviceable; but no

device seemed so effective, so cheap, so immediately and completely remedial as a corporation with large capital, managed by persons of railway experience, which should act as joint agent of all the railways constituting a natural route or system of routes—should furnish all the cars requisite, and should be the sole medium between the railways and the shipping public.

To the shipper, the introduction of a single responsible entity, with its representative in every important commercial centre, which gave him a bill of lading good from shipping point to destination, guaranteed its through rates and the prompt and safe delivery of his property, settled without delay his just claims, and furnished him an ample supply of cars, was a great boon. It secured safety to his large commercial ventures, by an assurance of certainty and celerity never before possible. It relieved his time, his patience, and his profits, of numberless and vexatious burdens, and permitted a steadfast concentration of capital and attention upon his legitimate undertakings, which added to their volume and valuable results.

The successive steps of progress towards the most effective form of such lines cannot be detailed here without exceeding desirable limits. But various methods were attempted, and with fair success. Some of their different forms are in use to-day, and with acceptable results. One much favored is that known as the "co-operative." In this method, the railway companies "co-operate" with each other under a specific name, such as the "Orange Line" or "Purple Line" or "Planet Line," or any other title, derived from color, extent, character of service, or field of operations, which may seem most applicable or attractive. A board of managers contains an official from each interested railway as its representative. Each road furnishes its agreed share of the equipment. The board select a manager and his assistants; the joint stock of cars are colored and lettered uniformly; bills of lading, way-bills, and all needful forms printed, and the organization presents itself to the public as a new competitor for their favor.

The chief merit plausibly claimed for this form is, that its only cost to the railway companies is the actual expense of its operations; while the allowances to a private corporation must

include a certain profit to the latter to warrant its existence, and that this profit is an additional tax upon the revenues of the roads.

A full statement of the influences which tend to render this theory delusive in practice, would be out of place here; but it may be briefly suggested that it is found the management of such organizations almost invariably prefer to reduce rates rather than lose tonnage, and that, in fact, larger net earnings are obtained from trade secured by private corporations whose own revenue is derived from a percentage of the rates charged, and who are, therefore, as much concerned as the railways themselves, that rates shall not sink below a profitable limit.

The co-operative system has other inherent weaknesses which affect its usefulness and add indirectly to its expensiveness. These will be adverted to elsewhere.

The Union Line preceded the Empire Line some two years, and in some respects was the precedent upon which the latter was based. It operated over the routes of which the original main line of the Pennsylvania Railroad from Philadelphia to Pittsburgh formed the controlling and most important link. It was managed with great skill and vigor, and its extraordinary success attested its exceeding popularity with the shipping public. Its operations were, however, confined to miscellaneous merchandise traffic, and beyond the limits of the Pennsylvania Railroad were chiefly conducted over lines which in the course of time passed under the absolute control of that road. When this took place it seemed possible to transform the organization into a bureau of the Pennsylvania Railroad Company, and such a change was effected by purchase in 1873. How far this metamorphose may ultimately restrain its effectiveness, as a seeker for new traffic in fresh fields, and as a competitor with other organizations from whose system the vital force of Private Interest has not been withdrawn, remains to be seen.

This force has a potency everywhere felt and recognized. It begets enterprise, insures watchfulness, and wrests value to its employers and profit to its owners from the most unfavorable elements and the most disheartening circumstances.

Some of its striking merits by which the Empire Transportation Company is especially fitted for the peculiar field covered by its operations, are worthy of recital here.

A co-operative line could achieve no success in this field. Every road traversed has other interests swaying them to other and apparently more natural connections. Agreements to disregard these impulses would be overtaken by the inevitable fate which attends all covenants to ignore self-interest. Their existence would create no faith in their effectiveness. Suspicion and distrust would be succeeded by rupture, and this possibly by renewals, to be followed by repetitions of the same story. The sense of instability would give weakness to the management, and if the organization did not absolutely perish, it would assume a chronic condition of marasmus almost equally fatal to its usefulness.

On the other hand, the independent corporation is identical in interest with the whole route—is an agent for every one of its several links—can, without officiousness, press upon the consideration of each a due consideration of the interests of all, and can keep in forcible operation all the elements which each part of the system has in common with the rest.

It furnishes all the cars which any road or all of the roads may call for. If these cars are idle from dullness in trade, it alone bears the loss. No dispute can arise among the roads as to a fairly-apportioned employment of the equipment when business slackens, or as to a just assignment of cars to be provided when traffic brightens. These causes of discord are eliminated by the duty which this separate company assumes.

It undertakes all the expensive risks of securing trade. Its agencies, its officers, and its cars are all provided at its own expense, and its only return depends upon its own efficiency.

If shippers avoid it; if commercial depression sweeps over the land; if any causes lessen or destroy its business, its outlays go on, and no road need or will step under a penny of the burden.

Its value as an adjunct to a great railway or system of railways has had another important and peculiar development, in the establishment of new forms, and the controlling of old forms of appliances and connections for securing trade.

In 1866 it purchased its first pipe line. The method was new, was full of risk; and this particular enterprise did not, in fact, earn for some years the cost of its operations. This system it has since expanded, and, under better conditions and with more ex-

perience, has made it a source of direct profit, while at the same time it has proved a powerful engine for controlling the carriage of petroleum over the lines of railway traversed by this Company's cars. No co-operative line has ever been entrusted with so costly and perilous a duty.

When the Philadelphia and Erie Road was ready to open its route in connection with the harbor of Erie, Pa., and the great chain of inland lakes, it was found that no practicable effort would in any reasonable time create a mart of trade at that port.

Buffalo and Oswego had all needful capital and appliances, and the habits of trade set with a solid and almost unchangeable movement towards those cities. Seaboard or transatlantic customers must be found who would prefer to purchase at originating points, and who would feel indifferent what inland routes were used, or inland cities threaded, provided their property was moved to destination with promptness, safety, and cheapness.

To accomplish these three requisites, steamers on the lakes; elevators and wharves at Erie; through lake and rail rates (never before given); through and responsible bills of lading (also an entirely new feature in connection with lake and rail traffic), were needful; and, in general, it was essential there should be a reduction of cost, hindrance, and annoyance as compared with any existing similar routes. This Company finally undertook to perform these duties, and with gratifying results.

Its operations by rail west of Erie were in part over roads with which this new lake line became a competitor; but a frank previous understanding with those roads, and a careful observance of equity in management, has enabled it to conduct both operations successfully, and without any clashing whatever—without, indeed, in all these years, a single complaint on the subject from any of the railways competed with.

This result points to another feature of excellence which the co-operative system does not possess,—effectiveness in satisfactorily dividing trade among competitors. A trunk railway of New York has at its western terminus several important, powerful, and competing connections. To satisfy each that it will get its due share of competitive trade, the trunk road has formed a separate co-operative line with each system of connections. The inevitable

result has been a fierce rivalry among those lines, similar in bitterness to all other kinds of internecine warfare. Each connection, through the co-operative organization assigned to it, fights each other connection, by secret reductions, and by all other hidden dodges and devices which the astuteness of keen minds, subjected to this ill-contrived and demoralizing stimulus, can conceive. The system, under these circumstances, destroys the revenues of the trunk stem, and yields it no resulting good; it frets the harmony that stem should preserve with all its connections; whilst among its officials it makes truth a jest, and a successfully-concealed breach of faith, an achievement for reward. Demoralization of this sort is, of course, everywhere an attendant upon reckless competition; but it is found in its intensest degree where the struggle for trade is fiercest in character, and most indifferent to correct business motives and principles.

Some of the foregoing facts and views were either unthought of or but vaguely considered at the inception of this Company. They have been evolved during the varied experiences of eleven years, but have confirmed in every way the wisdom of that judgment which selected the "Separate Corporation" as the most judicious and effective form of joint agency for securing and transporting competitive freight traffic.

In its essence, that form is as old as transportation itself. Not until some time after the advent of railways was the proprietorship of highway and vehicle combined. Common roads are owned by the community; individuals provide wagons and horses. Macadamized roads are customarily owned by proprietors who let their use for hire, but who furnish no part of the movable equipment. So with canals, and so with the earlier railways, except that, for reasons of safety, railway owners also provided locomotives.

DEVELOPMENT.

Some facts of progress may be in place here. Before the advent of canals, transportation in Pennsylvania was chiefly performed by wagons, stages, and boats. The wagons, drawn by four or six massive horses,

"With their orchestra of bells,"

were huge, broad-tired, canvas-roofed trains, employed on the

road by their agricultural owners in the idle farming period between the seedtimes of autumn and spring. "Conestoga teams" was their generic title; though "Pitt teams" designated those plying between the Delaware and the then small city of Pittsburgh, at the head of the Ohio.

Goods were receipted for, time guaranteed (about eighteen miles per day), and losses paid for by these primitive carriers, much as now. A load ranged from 5000 to 7000 pounds; and rates between Philadelphia and Pittsburgh were from two dollars to two and a half dollars per hundred pounds.

On the Susquehanna, a tideless river,—wide, rocky, and, except when flooded, extremely shallow,—long, covered barges, carrying perhaps a thousand bushels of grain, manned by a captain and crew of eight, was floated at high water from the upper valleys to Columbia. Some twenty tons of merchandise comprised its return cargo. It was a light task to drift southward on the swift waters rolling seaward, but the homeward journey up the stream was insufferably tedious and laborious. Four of the crew on each side of the barge pushed its slow length along by the continuous thrust of iron-shod poles against the river bottom.

About five days were consumed from Williamsport to Columbia, while the round trip occupied perhaps eighteen. The charges on grain were ten or twelve cents per bushel, and on merchandise about fifty cents per hundred pounds. The latter came from Philadelphia to Columbia by team, at an expense of "three levies" (thirty-seven and a half cents) to fifty cents per hundred pounds.

Among the early railways of Pennsylvania was one—twenty-five miles in length—from Williamsport to Ralston; part of a line designed to extend to Elmira, New York. On this twenty-five miles of strap rail, with a passenger tariff of five cents per mile, and freight charges of fifteen dollars per ton, an equipment of one passenger and two freight cars was found ample to care for the business presented.

Contrast these with later statistics, produced since lessened cost, widened area of movement, obliteration of transfers and of multitudinous hindrances, increased scope, and singleness of responsibility have begotten a magnitude of movement never before seen or conceived of among men; since bills of lading have been issued

from Hong Kong via America to London, and great masses of provisions and other traffic have been moved by this Company, under similar bills, from inland American cities to cities of interior Europe.

For example: in 1864, the last year of continuous civil war in the United States, the Pennsylvania Railroad, in common with all other east and west lines in the northern part of the United States, found its capacity severely taxed by the volume of traffic pressing for movement, and, as was natural and proper, sold its service at good and largely profitable rates. During the following ten years, all of its plant and appliances were continuously increased in quantity and excellence. All of its rivals adopted a like policy. The inevitable consequence was a steady decline in transportation charges, but another consequence was a steady growth of property movement, almost startling in its volume.

Thus, in 1864, the Pennsylvania Road moved 2,585,379 tons, for a combined distance equivalent to a movement of 420,627,222 tons one mile; and its charges for this were, in gross, $10,361,999.32, or an average of $2\frac{46}{100}$ cents per ton per mile; whilst in 1874 it transported 8,626,946 tons, for a combined distance equivalent to a movement of 1,372,566,976 tons one mile, at a gross charge of $17,504,155.57, or an average rate of $1\frac{28}{100}$ cents per ton per mile.

Therefore in ten years the tons moved increased *three hundred and thirty-four per cent.;* the ton mileage *three hundred and twenty-six per cent.;* while the gross freight earnings increased but *one hundred and sixty-nine per cent.;* and the average earnings per ton per mile were, in 1874, but *fifty-two per cent.* of the average in 1864.

Nothing could better illustrate, than these contrasted facts, the stimulus to industrial productiveness, and to the interchange and consumption of products, resulting from a diminution of the various forms of embargo which Nature imposes upon freedom, rapidity, and cheapness of movement; and nothing could show more clearly, how excessive, during the last decade, has been the creation of railway capacity in the northern portions of this Union.

As one other phase of development, it may be stated that the Empire Transportation Company moved, in the first year of its existence, 74,043 tons, a combined distance equivalent to 37,021,500

tons one mile; and in the tenth year of its life, ending June 30th, 1875, it moved, on its rail, lake, and pipe lines, 1,489,623 tons, a combined distance equivalent to 814,639,468 tons one mile.

THE FUTURE.

It cannot be truthfully claimed that this Company has achieved even approximate perfection. The effectiveness of other methods is freely admitted; but for this form (not this Company) is claimed greater vigor, more fitness for large and successful expansion, less friction with railways and with shippers; much less risk, and, on the whole, better net results to the roads and to the public.

In one field, this form of fast freight organization is almost untried—namely, in securing a division of trade among railway competitors. When its adaptedness to this duty shall have been fully examined, there is but little doubt it will enter upon and effectively perform the most important function it can ever undertake. Unless prevented by an uninstructed public sentiment, or unwise individualism among railway managers, it will obliterate competition of the foolish and destructive sort; end the need for secret rates, and unjust distinctions between competitive and non-competitive localities; secure stability in rates, and all of the beneficial effects of consolidation, freed from many of its disadvantages. It will assure to the public courteous attention to their business, and quick and regular movement at moderate and seldom varied prices.

These may seem exaggerated ideas now, but the need for their realization was never so great; and this pressing necessity, at present groping in various ineffective ways for relief, will perhaps at last find it in the mode here indicated.

MEMORANDA.

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